

EXPLANATION

AREAS OF MINERAL RESOURCE POTENTIAL

W Tungsten
M Marble
Q Gem stones
G Geothermal energy
Au Gold and silver
x-6 MINE OR PROSPECT—Number refers to table of mines and prospects
--- CONTACT—Dashed where approximately located
--- BOUNDARY OF ROADLESS AREA

CORRELATION OF MAP UNITS

SEDIMENTARY ROCKS

QUATERNARY

VOLCANIC ROCKS

PLUTONIC ROCKS

METAMORPHIC ROCKS

CHETACHOUS

CHETACHOUS OR JURASSIC

JURASSIC OR TRIASSIC

TRIASSIC OR PALEOCENE

DESCRIPTION OF MAP UNITS

SEDIMENTARY

SURFICIAL DEPOSITS (QUATERNARY)—Largely glacial moraine, but includes alluvium and talus

VOLCANIC ROCKS

VOLCANIC ROCKS, PLUGS, AND FLOW (TERTIARY)—Hornblende andesite and trachyte

PLUTONIC ROCKS

YOUNGER PLUTONIC ROCKS (CHETACHOUS)—Numerous bodies of fine- to medium-grained granitic rocks ranging in composition from granodiorite to granite

OLDER PLUTONIC ROCKS (CHETACHOUS OR JURASSIC)—Predominantly medium-grained quartz diorite but ranges from fine to coarse grained and from gabbro to granite. Sheared in many areas

METAMORPHIC ROCKS

METAVOLCANIC ROCKS (JURASSIC OR TRIASSIC)—Biotite schist and hornfels derived from lava flows and extensively recrystallized rhyolite tuff and tuff breccia

METASEDIMENTARY ROCKS (TRIASSIC OR PALEOCENE)—Principally quartzite, schist, marble, and hornfels. Includes small schistose-bearing tuffaceous bodies

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral resource potential survey of the Dinkey Lakes Roadless Area in the Sierra National Forest, Fresno County, California. The Dinkey Lakes Roadless Area (5244) was classified as a further planning area during the Sierra National Forest Area Review and Evaluation (NAME 11) by the U.S. Forest Service, January 1979.

SUMMARY

The Dinkey Lakes Roadless Area comprises approximately 117,400 acres (47,590 ha) on the western slope of the central Sierra Nevada of California, Sierra National Forest, California. The area, underlain by various kinds of granitic rocks and remnants of metamorphosed pregranitic rocks, is extensively mantled with glacial till.

Tungsten has been produced from tectite zones in the area, and a high tungsten resource potential is in metamorphic rocks in the southwestern part of the area. A nearly pure calcite marble in the southwestern part of the area meets limestone specifications for Portland cement and has a moderate resource potential for that purpose.

Spiky quartz crystals occur in cavities in granite in the south-central part of the roadless area. The crystals have moderate mineral resource potential as amorphous gem stones.

Thermal spring activity in the northeastern part of the area has low potential for geothermal energy.

A prospect near the southwestern boundary of the area has yielded a minor amount of gold and has low potential for gold and silver resources. The remaining geologic environments within the area have low potential for the occurrence of mineral resources.

INTRODUCTION

The Dinkey Lakes Roadless Area covers approximately 117,400 acres (47,590 ha) of the Sierra Nevada in Sierra National Forest, Fresno County, California. During 1980 the U.S. Geological Survey and the U.S. Bureau of Mines conducted field investigations to determine the mineral resource potential of the roadless area.

A geologic map of the Dinkey Lakes Roadless Area was compiled after field checking existing geologic maps. Much of the area is underlain by granitic rocks extensively mantled with glacial debris; however, remnants of pregranitic rocks are locally present. A variety of metamorphic rocks, principally quartzite, schist, marble, and hornfels, occurs in a roof pendant in the southeast part of the area and an extensive inclusion south of the pendant. These rocks were metamorphosed and locally metamorphosed during intrusion of plutonic rocks. Metamorphic rocks in the area include quartzite, schist, marble, and hornfels. Ages of the metamorphic rocks are uncertain, but on the basis of regional setting and lithologic correlations, the metamorphic rocks are believed to be of Paleocene to Tertiary age, and metamorphic rocks, Triassic or Jurassic.

Numerous bodies of plutonic rocks ranging in composition from gabbro to granite are separated by sharp, steeply dipping or vertical contacts. The oldest plutonic rocks, believed to be Jurassic or Tertiary, are included in the metamorphic roof pendant. Most of the granitic rocks in the southwest third belong to a Early Cretaceous sequence. Tectite-bearing rocks in the northwestern two-thirds of the area belong to a Late Cretaceous sequence.

GEOCHEMISTRY

A reconnaissance geochemical sampling of stream sediments and panned concentrates from stream sediments delineated only a previously known area of mineralization in the Dinkey Lakes Roadless Area.

Anomalous concentrations of tungsten, beryllium, bismuth, and copper were found in the heavy, nonspecific fraction of mineral concentrates collected in the southwest part of the area where metamorphic rocks crop out. Tungsten has been mined in the southwest part of the area, and tectite samples taken from the mines show a tungsten-beryllium-bismuth-copper association.

MINING DISTRICT AND MINES

The Dinkey Creek mining district in the southwest part of the Dinkey Lakes Roadless Area is the only district in the area. Tungsten production has been recorded from two mines. The Rainbow mine has been worked by adit methods intermittently since 1962, with total production of about 3,000 short-ton units (17,000 kg) of tungsten trioxide concentrate. The Mud Lake mine yielded about 4,800 short-ton units (43,500 kg) of tungsten trioxide concentrate from an open pit; a substantial portion of the ore body has been removed.

MINERAL RESOURCE POTENTIAL

High potential exists for deposits of tungsten, moderate potential for marble and amorphous gem stones, and low potential for gold and silver deposits and geothermal energy in the Dinkey Lakes Roadless Area.

Tungsten—Tungsten deposits occur in contact metamorphic deposits along margins of the metamorphic roof pendant and in metamorphic inclusions near the pendant in the southwest part of the area. Schistose (calcitic tungstate) has been locally introduced in lenses and sheets in tectite layers interbedded with schist in the pendant and small tectite inclusions south of the pendant.

All schistose-bearing surface outcrops in the area have probably been found, but subsurface exploration in the southwestern region could lead to the discovery of additional tungsten resources.

The area of high tungsten potential is outlined on the map, and criteria used to define the area are listed below:

1. Existing mines with recorded production;
2. Exploration records;
3. Geochemical anomalies and high assay values;
4. Surface and subsurface occurrence of mineralized tectite; and
5. Intrusive felsic plutonic rocks in contact with metamorphic rocks.

Marble—A finely laminated marble unit exposed in the roof pendant in the southwestern part of the roadless area is suitable for cement and aggregate. The formation is probably clastic in origin.

Transportation costs are a major factor in determining the value of the marble as a mineral resource; therefore, consideration must be given to the possibility of future major construction in the region.

The area of moderate marble potential is outlined on the map, and criteria used to define the area are listed below:

1. Linear extent of the exposed marble;
2. Nearly pure calcite; and
3. Analyses meet chemical specifications for Portland cement.

Gem stones—Spiky quartz (ecorin) crystals have moderate potential for amorphous gem stones; they occur at a well-known collectors locality in a low-quartz-equivalent (0.65 ha) area in the south-central part of the roadless area. The crystals are present in numerous micritic cavities in light-colored, garnet-bearing granites.

The area of moderate gem stone potential is outlined on the map, and criteria used to define the area are listed below:

1. Spiky quartz crystals of gem quality in granite; and
2. Prospect pits.

Geothermal energy—Thermal spring activity in the northeastern part of the area is an identified hot-water convection system. Surface temperatures are estimated to be most likely 56°C. The system has low potential for geothermal energy.

Gold and silver—Sulfide-bearing quartz samples containing low gold and silver values were collected at the McKeown prospect adjacent to the northwestern boundary of the roadless area. Minor amounts of gold have been produced from the sulfide-bearing quartz veins that discontinuously crop out along the margins of a granitic intrusion. The property has low potential for gold and silver resources.

Other commodities—Although small low-grade placer gold deposits are present near the roadless area, none are known to occur within the area. Sand and gravel resources are abundant in the area; however, placer and more accessible deposits are available closer to potential markets.

REFERENCE CITED

Dodge, F. C. W., 1982, Geologic map of the Dinkey Lakes Roadless Area, Fresno County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1389-A, scale 1:62,500.

Nines and prospects

[Underlined names refer to properties with mineral resource potential; those not underlined have no potential or are poorly exposed and a determination cannot be made]

Map Number Name (commodity) Summary Production and workings Resource estimate

1 Unnamed prospect (gold, silver) A light-colored metachertite remnant overlies biotite hornfels which strikes N. 33° W. and dips 60° NE. The metachertite contains finely disseminated pyrite. None Two chip samples of metachertite contain no gold, silver, or tungsten.

2 Copper Dome prospect (gold, silver) A metachertite bed is slightly limestone stained and contains as much as 3 percent finely disseminated pyrite. Nine chip samples were taken of metachertite. Three samples contain trace gold; two samples have 0.2 to 0.4 silver per ton (6.9 g/t).

3 Unnamed prospect (gold, silver, tungsten) Limestone-stained biotite hornfels strikes N. 50° E., dips 45° NW, and contains quartz pods and lenses 1 to 12 in. (2.5 to 30 cm) long and 1 to 12 in. (2.5 to 30 cm) thick. The hornfels is underlain by diorite and hornfelsite diorite. Three chip samples were taken. Two samples of hornfels contain 0.2 to 0.4 silver per ton (6.9 g/t) no gold. One sample has 0.04 percent W.

4 Unnamed prospect (cement, limestone aggregate) A massive gray marble bed composed primarily of calcite is in contact with quartzite containing finely disseminated sulfides. Surface outcrops of the north-trending marble bed are approximately 1,450 ft (440 m) long and 350 ft (100 m) wide. An estimated 20 million tons (18 million t) of marble meet chemical specifications for Portland cement. Samples taken across the quartzite contained no anomalous amounts of metals. A moderate potential for limestone aggregate exists on the prospect.

5 Rainbow mine (tungsten) Tectite zones are along a contact between metamorphic rocks and a complex dioritic intrusive body. Schistose of suitable grade is localized along sheets and lenses within the tectite zones. The principal zone has surface outcrop dimensions of 40 x 150 ft (18 x 45 m), elongated N. 30° W., and has been explored to a depth of 180 ft (55 m). Three lens-shaped schistose-bearing tectite zones are near the principal zone. About 3,000 short ton units (27,000 kg) of tungsten concentrate have been produced from the mine. Two adits, 250 and 40 ft (76 m and 12 m) long, and one sloughed prospect pit are on the zone. Development in the longest adit includes about 200 ft (60 m) of drift and slopes, and a 75 ft (23 m) deep, water-filled shaft.

6 Black Diamond prospect (gem stone) Clear to smoky quartz crystals in stactolite, garnet-bearing granite. Crystals commonly range from 1 to 4 in. (2.5 to 10 cm) in length. An estimated 166,000 tons (149,000 t) of indicated and inferred subeconomic resources average 0.12 percent W. Select samples contain as much as 2.28 percent W. A high potential exists for the discovery of additional tungsten resources.

7 Yellow Diamond prospect (gem stone) Quartz crystals in micritic granite. Four pegmatite dikes striking N. 35° E. and dipping steeply contain a few smoky quartz crystals up to 5 in. (13 cm) long. Large felsic crystals, and biotite books. One large pit, two small, shallow pits. Quartz crystals are generally clear and free of fractures or inclusions; therefore, most crystals meet gem-quality specifications. Four samples were taken; one sample of quartz contained trace gold and 0.2 to 0.4 silver per ton (6.9 g/t). There is moderate potential for gem-quality quartz.

8 Unnamed prospect (gold, silver) A sugary textured quartz vein about 28 in. (71 cm) thick strikes N. 40° W. and dips 60° NE, paralleling a fault zone. The vein is limestone and manganese stained and contains finely disseminated pyrite. Country rock is phyllite. Quartz crystals are generally clear and free of fractures or inclusions; therefore, most crystals meet gem-quality specifications. Four grab samples of pegmatite contain as much as 0.2 to 0.4 silver per ton (6.9 g/t) and no gold. There is moderate potential for gem-quality quartz.

9 Young Group prospect (tungsten) Tectite zones are along a metamorphic-granitic rock contact trending N. 30° W. Schistose is sporadically distributed in small pods and lenses within the tectite zones. The zones range from 1 in. (3 cm) to about 3 ft (1 m) thick and up to 50 ft (15 m) long. Production consists of one short ton unit (9 kg) of tungsten trioxide concentrate. Development includes 200 ft (60 m) of underground workings and several sloughed trenches and pits. An estimated 800 tons (723 t) of tectite contains an average grade of 0.13 percent W. There is a moderate potential for discovery of additional tungsten resources.

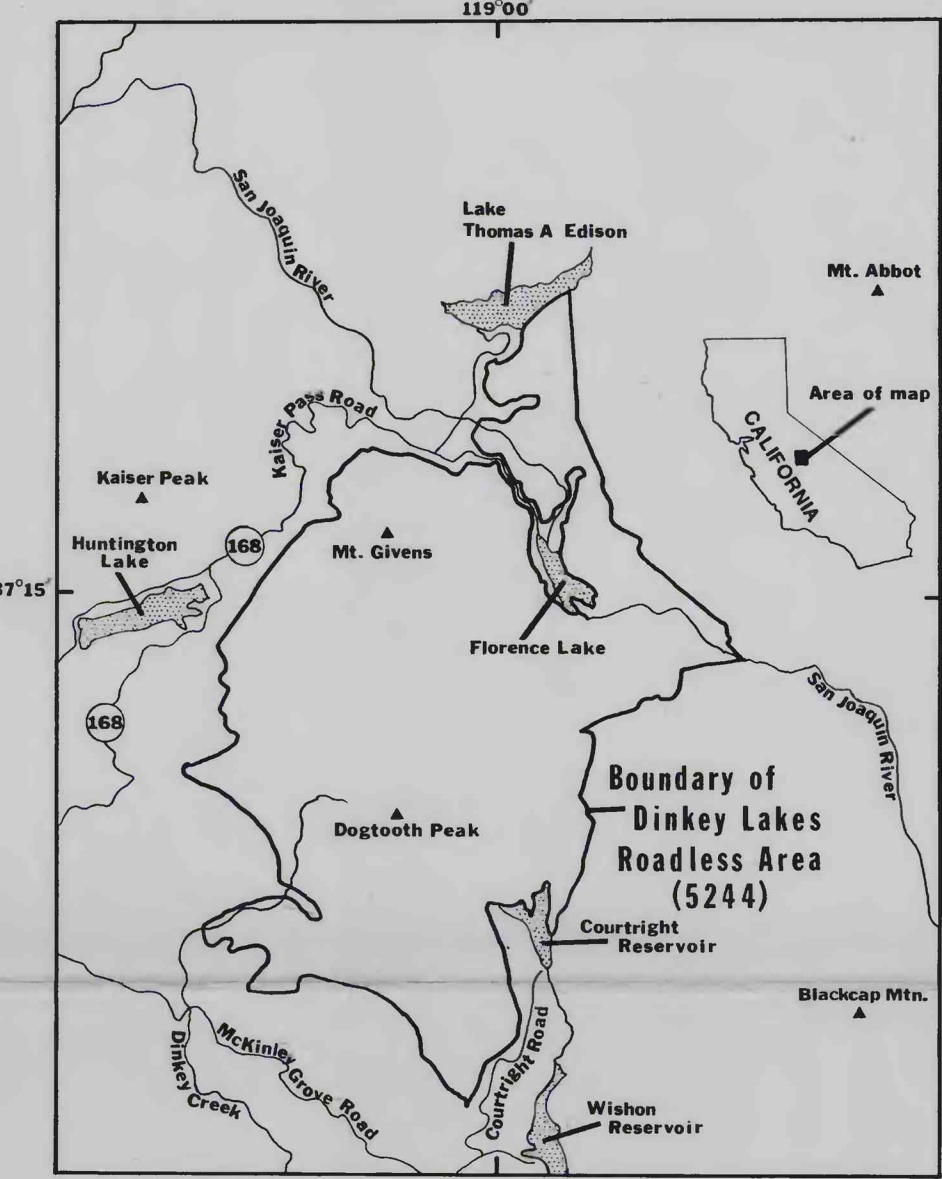
10 Mud Lake mine (tungsten) Metasedimentary remnant up to 400 ft (120 m) long contains variable amounts of tectite. The main ore body has been substantially mined and much of the remaining tectite is barren. Country rock is a granitic intrusive. Production records indicate about 4,800 short-ton units (43,500 kg) of tungsten concentrate has been produced from the mine. Development consists of a 125 x 75-ft (38 x 23-m) open pit and numerous prospect pits and trenches. An estimated 20,000 tons (18,000 t) of tailings contains an average grade of 0.18 percent W. There is a moderate potential for discovery of additional tungsten resources.

11 South Dinkey prospect (tungsten) Small tectite pods up to 3 ft (1 m) thick and 40 ft (18 m) long are included in granitic rocks. Five samples were taken at the prospect. One chip sample of tectite contains trace gold and 0.01 percent W.

12 Unnamed prospect (gold, silver) Fractures of fine-grained, equigranular granitic rocks are highly mineralized. These pervasive, closely spaced fractures strike N. 3° E. and dip 80° NE. One grab sample contained no anomalous economic minerals.

13 Lone Wolf prospect (tungsten) A small metamorphic roof pendant with a 200 ft (150 m) long by 30 ft (9 m) thick tectite zone overlies granodiorite. A schistose inclusion in the southern end of the tectite outcrop, which trends N. 30° E. An estimated 17,000 tons (15,500 t) of tectite with an average grade of 0.24 percent W is in the zone. A moderate potential exists for the discovery of tungsten resources.

14 McKeown prospect (gold, silver) Quartz veins outcrop discontinuously along the margins of a granitic intrusion. Pyrite and numerous vugs are present in the limestone-stained quartz veins. A 3-ft (1-m)-thick silty quartz vein strikes N. 27° E. and dip 80° W., and a similar 1-ft-thick (30 cm)-thick vein strikes N. 12° W. and dips 80° E. Bureau of Mines records show 6.66 to (202 g) of gold per ton; two other quartz grab samples have trace gold. Ten chip samples of quartz contain as much as 0.4 to 0.6 g/t silver per ton. A low potential exists for discovery of additional gold and silver resources.



INDEX MAP OF THE DINKEY LAKES ROADLESS AREA

Explanatory pamphlet accompanies map

Base from U.S. Geological Survey, 1:62,500, Kaiser Peak, Mount Abbot, Huntington Lake, Blackcap Mountain, 1953

APPROXIMATE MEAN DECLINATION, 1982

SCALE 1:62,500
CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology modified from Dodge, 1982

MINERAL RESOURCE POTENTIAL MAP OF THE DINKEY LAKES ROADLESS AREA, FRESNO COUNTY, CALIFORNIA

By
F. C. W. Dodge¹, F. E. Federspiel², D. B. Smith¹, H. W. Campbell², D. F. Scott², and J. M. Spear²

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¹U.S. Geological Survey
²U.S. Bureau of Mines